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AUTHOR Tindall, Lloyd W.; Gugerty, John J.
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ABSTRACT

Microcomputer assisted instruction for the vocational education of special needs students is in the formative stage. Computer programmers do not understand educational processes well enough to produce effective software, while the majority of special needs educators lack computer training. Special needs educators need to use existing knowledge in the area of computer assisted instruction (CAI) to modify or develop programs to meet their students' learning styles. Some other suggestions to get CAI initiated are preservice and inservice on computers, learning material development, and incentives for teachers to learn CAI. The role of CAI in the curriculum can be to supplement the regular curriculum; reduce instructional time; operate at the special needs students' pace; give instant feedback; provide tutoring, drill, and practice as well as tests and questions; and provide surprise, challenge, and curiosity. Components of good CAI program designs are student control, individualized instruction, modularized programs, multisensory presentations, and clearly written support materials and documentation. (Following four pages of narrative, six examples of programs for disabled persons are provided. A final section contains annotated listings of resources of three types: software vendors, organizations, and publications.) (YLB)

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Microcomputers for the Vocational Education of Special Needs Students

by

Lloyd W. Tindall and John J. Gugerty

Vocational Studies Center
University of Wisconsin-Madison
964 Educational Sciences Building
1025 West Johnson Street
Madison, Wisconsin 53706

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Microcomputers for the Vocational Education of Special Needs Students

Microcomputer assisted instruction for special needs students is in the formative stage. Relatively few vocational educators are using CAI and even fewer special needs educators have incorporated CAI into the curriculum. Programs which are in use are primative in design, do not incorporate educational psychology into the format and do not utilize the rapidly advancing capabilities of the equipment.

Computer programmers may not understand educational processes well enough to develop effective software. On the other hand, the majority of special needs educators may not be computer literate or capable of programming computers effectively. This lack of training and coordination is compounded by a lack of effective software and at present a lack of microcomputers.

What Can CAI Assisted Instruction Offer?

Microcomputer assisted instruction can make a change in the educational development of special needs students. We know that special needs students in some instances have unique learning styles, however, they often have the same learning styles as the regular student. Therefore special needs educators must borrow, modify or develop their own CAI programs to meet these various learning styles. Due to the scarcity of CAI programs in vocational education in general, the borrowing and adapting practices may be limited. However, there is currently a lot of CAI research and development taking place. It is up to special needs educators to utilize the existing knowledge to the best advantage for use with special needs students.

Gephart, Strother and Duckett listed several ways in which microcomputers can effect students learning.

1. Problem solving skills can be taught. Simulated situation can be set up to help discover and learn how to solve problems.
2. Computers can graphically display and illustrate information to accommodate the unique learning style of the student.
3. Each student can receive individualized instruction and an interactive experience with the computer. The pace of learning can be controlled by the student.

4. Using the microcomputer as a word processor can remove the chore of writing and allow concentration on learning content.
5. The intellect may be developed more fully for students able to program computers.
6. Communication will be faster, more accessible and cheaper. Communication with the severely handicapped may be enhanced.

Other suggestions to help get CAI initiated were: 1) Provide preservice and inservice on what computers can do; 2) Develop highly-interactive, computer-based learning materials; 3) Research to find how high level materials can be produced; 4) Provide incentives to teachers to learn CAI; 5) Consider individualized instruction for all students; 6) Use group dynamics - two or three teachers at a display; and 7) Use the computer in special areas of learning to help solve problems.

Attributes of CAI in the Classroom

CAI should be highly interactive with special needs students. CAI has the ability to provide variety, challenge, fantasy and curiosity to the curriculum. However, these attributes of the microcomputers cannot be utilized by placing the traditional eight by eleven page on the computer. Appropriate educational psychology must be used in the development of microcomputer programs.

Microcomputer programs do have a place in the vocational curriculum for special needs students. The role that CAI will have is not yet fully determined. Some indications of what that role is along with some of the attributes of CAI instruction follow.

1. Provide a supplement to the regular curriculum
2. Provide improved achievement
3. Provide an informal interaction at a low anxiety level
4. Can reduce instructional time
5. Can operate at the special needs students pace
6. Can be superior to lectures and textbooks
7. Does not talk down to or embarrass students
8. Can give students instant feedback
9. Can provide tutoring and drill and practice
10. Can assist in problem solving
11. Can provide surprise, imagination, challenge, and curiosity
12. Can test and question

What to Include in Good CAI Program Designs

CAI programs can be designed to fill nearly any type of role desired and good designs are essential if CAI is to be practical and effective. DeBoer provided some guidelines for CAI design. He was specifically addressing the needs of Adult Basic Education students, however, it seems that most of these guidelines apply also to special needs students. These guidelines are listed below:

1. The student should have as much control as possible over the sequence of the instructional program. Sequenced learning should include review, level of difficulty, selection and amount of material to be completed.
2. Instruction should be individualized to suit the individuals abilities and learning styles.
3. Programs should be modulized so that student can select needed modules with the needed competencies.
4. Students should be informed about that which they are unable to do and learning activities should be developed with mastery of these activities in mind.
5. Develop multisensory presentation.
6. Remember the human factors, write programs on student level, write to hold interest and trust, be clear in expectations.
7. Programs should provide clearly written support materials and documentation.

DeBoer also cautioned on the use of text and graphics. For instance, there should never be more than 50 percent of the screen filled at any one time. Graphics can be used to break the monotony but should not be used just for the sake of using them. CAI programs should have clear instructions which do not frustrate the student. Students should be given examples on how responses are inputted and not forced into a trial and error method. The number of incorrect responses should be limited before moving on to the next frame and the student should be able to control access to the next frame. It is also well to have a variety of CAI lessons from which to choose.

Finally DeBoer provide six questions to ask about the CAI program:

1. How does the program present instruction? The unique capabilities such as erasing, rewriting, and flashing or animation to show concepts should be used.
2. Are the lessons interactive? Are prompts used? Explain why choice is wrong. Lead student to the correct choice. Reinforce correct responses.

3. Does the program use dialog devices to get interest? Is humor, pace change, surprise used to maintain longtime interest?
4. If typed responses are required, does program accept key words or parts of words?
5. Does program periodically report student performance?
6. Is language level appropriate?

As you probably realize by now the above suggestions and program development criteria can be used to assist in program development or evaluation. Some of the basis for developing your own CAI have been discussed. It is up to you to become involved in CAI and utilize the available technology for the benefit of yourself and your special needs students.

Fear of the Microcomputer

Rumors are around that microcomputers will make teachers obsolete and will cause their replacement. Learning about computers and getting hands-on experience will help alleviate these fears. In reality microcomputers will allow teachers to devote more time to the personal aspects of teaching. Curriculum will need to be rewritten to include CAI and of course excellent teachers will be needed to program or direct appropriate educational psychology based program development. Therefore, the reliability upon the teacher will be even more important.

Examples

The ways in which computers can be used to improve educational and/or employment services to handicapped students can be categorized as follows:

1. a communication aid
2. an environmental control; and
3. an instructional aid

The use of computers as instructional aids can be further subdivided into:

a) instructional software itself - programs designed to assist learners by providing them with an opportunity for individualized instruction, self-paced lessons, remediation as indicated by the users performance, repetition as needed or desired, and immediate performance feedback

b) adaptive equipment which enables the computer to be used effectively by persons with visual or physical disabilities

c) the curriculum sequence surrounding any given unit of instructional software by which CAI unit is integrated into the overall instructional sequence.

These examples are meant to demonstrate what is possible. They are not to be viewed as the only examples, nor even necessarily the best examples, of how one might use computers effectively with persons who are disabled.

Examples One and Two were developed specifically for retarded students who have very limited academic skills. Examples Three and Four were developed for use by any student taking the class in which that program was used. However, these programs could be modified as needed to build in practice subroutines, additional or more varied feedback, or more step-by-step presentations (including graphics) as indicated by students' performance. Examples Five and Six describe modifications in computer hardware which are designed to make the computer more accessible to persons who have severe physical disabilities.

Example I

Instructional Software

Name of Program Keyboard Trainer

Make and Model of Computer on Which it is Used Texas Instruments 99/4A microcomputer (tape or disk)

FOR SALE

yes X no ___

Order from:
Request ordering information from contact person.

DEVELOPER

Sam Jenkins
907 6th Ave, East
Menomonie, WI 54751
715/235-5775

CONTACT PERSON

Sam Jenkins
The Upper Room
907 6th Avenue East
Menomonie, WI 54751
715/235-5775

VOCATIONAL AREA(S)

All which could use CAI with mentally retarded students.

FOR WHICH STUDENTS

Mentally retarded students (EMR-TMR)

PROGRAM FORMAT

Drill and practice

PROGRAM DESCRIPTION

The keyboard trainer is a first program that may be useful to introduce the student to the computer. A graphic representation of the keyboard, just as the student sees it, is given on the screen. All of the keys are blank, except one. The letter or numeral for that key flashes on and off and verbal prompts are given from the speech synthesizer. As the student progresses through the program they will gain some familiarity with both the keyboard and how their actions influence what happens on the screen.

Because the program presents no menu (which would require reading ability on the part of the user) nor instruction segments during the running of the program to distract the student, a teacher or student tutor must help the MR student at least during the first few runs of the program.

MODIFICATIONS FOR SPECIAL POPULATIONS

Speech, using a speech synthesizer
music
animated graphics

Example II

Instructional Software

Name of Program Talking Typewriter (Word recognition and spelling drill)

Make and Model of Computer on Which it is Used Texas Instruments 99/4A Microcomputer (tape or disk) with TI's Terminala Emulator II Command Module

FOR SALE

yes X no ___

Order from:
Request ordering information from contact person.

DEVELOPER

Sam Jenkins
907 6th Ave. East
Menomonie, WI 54751
715/235-5775

CONTACT PERSON

Sam Jenkins
The Upper Room
907 6th Ave. East
Menomonie, WI 54751
715/235-5775

VOCATIONAL AREA(S)

All which could use CAI with mentally retarded students.

FOR WHICH STUDENTS

Mentally retarded students (EMR-TMR)

PROGRAM FORMAT

Drill and practice

PROGRAM DESCRIPTION

Using TI's Terminala Emulator II Command Module, each word and sentence is spoken through the speech synthesizer as it is typed. Lists of words can be entered by the instructor and the computer will instruct the student, through the synthesizer, to type the words.

Because this program does not present a menu (which would require reading ability on the part of the user) and does not have instruction segments during the running of the program to avoid distractions, a teacher or student tutor must help the MR student at least during the first few runs of the program.

MODIFICATIONS FOR SPECIAL POPULATIONS

Speech, using a speech synthesizer
music
animated graphics

Example III

Instructional Software

Name of Program Construction Framing Estimation

Make and Model of Computer on Which it is Used HP 2000 Timesharing Language HP BASIC

FOR SALE

No (tape or disk). This and other programs are printed out in Iowa. Handbook of BASIC computer programs for Industrial Arts. For info. write: Iowa DPI, Career Ed. Div. Grimes State Office Bldg. Des Moines, Iowa 50319

DEVELOPER

Don Foth
Plainfield Community School
Plainfield, IA 50666

CONTACT PERSON

Don Foth
Plainfield Community School
Plainfield, IA 50666

VOCATIONAL AREA(S)

Industrial Arts (construction)

FOR WHICH STUDENTS

All

PROGRAM FORMAT

Problem Solving

PROGRAM DESCRIPTION

This program deals with the basics of estimating the materials needed to frame a house. It can be used to estimate the quantity of plate material, sheathing, studs and ceiling joists. To run this program effectively, the user should have a white print of the building, a pencil and some scratch paper. It is written for the senior high school and adult education levels for use in conjunction with a unit on estimating.

See following pages for program listing.

MODIFICATIONS FOR SPECIAL POPULATIONS

The Program:

```
 10 REM ESTIMATING MATERIALS
 20 PRINT "HELLO THERE, PLEASE TYPE IN YOUR FIRST NAME"
 30 DIM N$[9]
 40 INPUT N$
 50 PRINT "HI  "N$"   THIS IS A PROGRAM IN THE AREA OF CONSTRUCTION"
 60 PRINT "DEALING WITH ESTIMATING THE MATERIALS NEEDED TO FRAME"
 70 PRINT "A HOUSE OR BUILDING."
 80 PRINT
 90 PRINT "   YOU WILL NEED SOME MEASUREMENTS BEFORE YOU START."
100 PRINT "YOU WILL NEED TO KNOW THE TOTAL LENGTH OF ALL YOUR"
110 PRINT "INSIDE AND OUTSIDE WALLS AND PARTITIONS FOR ESTIMATING"
120 PRINT "THE PLATE MATERIAL."
130
140 PRINT "  FOR ESTIMATING THE STUDS YOU NEED TO KNOW THE LENGTH"
150 PRINT "OF ALL YOUR WALLS AND ALSO THE NUMBER OF CORNERS,"
160 PRINT "INTERSECTIONS AND OPENINGS IN YOUR BUILDING."
170 PRINT
180 PRINT "  TO CALCULATE THE NUMBER OF CEILING JOISTS YOU"
190 PRINT "NEED TO KNOW WHICH WAY YOUR JOISTS ARE RUNNING TO"
200 PRINT "FEED IN THE CORRECT WALL LENGTH."
210 PRINT
220 PRINT "  TO ESTIMATE THE AMOUNT OF SHEATHING NEEDED YOU"
230 PRINT "MUST KNOW THE PERIMETER OF YOUR BUILDING AND THE TOTAL"
240 PRINT "AREA OF ANY LARGE OPENINGS SUCH AS DOORS AND WINDOWS."
250 PRINT
260 DIM V$[9]
270 LET V$="YES"
280 DIM W$[9]
290 LET W$="NO"
300 PRINT " DO YOU HAVE THE INFORMATION NEEDED TO RUN THIS"
310 PRINT "PROGRAM? TYPE IN YES OR NO "
320 DIM Z$[9]
330 INPUT Z$
340 IF Z$= THEN 390
350 IF Z$ = W$ THEN 1480
360 PRINT "PLEASE PRINT YES OR NO"
370 GO TO 330
390 PRINT "WELL IT LOOKS LIKE YOU'RE READY TO GO."
400 PRINT
400 PRINT
410 PRINT "JUST TELL ME WHAT YOU WANT TO ESTIMATE"
420 PRINT "1. PLATE MATERIAL"
430 PRINT "2. STUDS"
440 PRINT "3. CEILING JOISTS"
450 PRINT "4. SHEATHING"
460 PRINT
470 PRINT " WHAT IS YOUR CHOICE: 1,2,3,OR 4"
480 INPUT A
490 GOTO A OF 510,670,910,1020
500 REM**********FIGURING PLATE MATERIAL**********
510  PRINT "TO FIGURE THE AMOUNT OF PLATE MATERIAL NEEDED WE"
520 PRINT
530 PRINT "ADD THE OUTSIDE WALLS AND ANY INSIDE PARTITIONS"
540 PRINT
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550 PRINT " AND MULTIPLY THIS BY 3(1SOLE PLATE AND 2 TOP PLATES)"
560 PRINT
570 PRINT " AND TO THIS YOU ADD ON 10% AS A WASTE FACTOR."
580 PRINT
590 PRINT "WHAT IS THE TOTAL LENGTH OF ALL THE WALLS AND PARTITIONS.";
600 INPUT B
610 LET C=(3*B)*.1
620 LET D=(3*B)+C
630 PRINT
640 PRINT
650 PRINT "TOTAL PLATE MATERIAL NEEDED IS ";D;" FEET."
660 GOTO 1300
670 REM**********FIGURING STUDS NEEDED**********
680 PRINT " THE TOTAL LENGTH OF ALL THE WALLS AND PARTITIONS IS";
690 PRINT
700 PRINT "NEEDED TO ESTIMATE THE NUMBER OF STUDS NEEDED."
710 PRINT
720 PRINT "WHEN THE STUDS ARE PLACED 16IN O.C. WE MULTIPLY"
730 PRINT
740 PRINT "THE LENGTH BY 3/4 AND THEN ADD TWO STUDS FOR EVERY"
750 PRINT
760 PRINT "CORNER, INTERSECTION AND OPENING"
770 PRINT
780 PRINT "INPUT THE TOTAL LENGTH OF ALL THE INSIDE AND OUTSIDE WALLS"
790 INPUT E
800 PRINT "NUMBER OF CORNERS";
810 INPUT F
820 PRINT "NUMBER OF INTERSECTIONS";
830 INPUT G
840 PRINT "NUMBER OF OPENINGS";
850 INPUT H
860 LET I=E*3/4
870 LET J=2*(F+G+H)
880 LET K=I+J
890 PRINT "THE TOTAL NUMBER OF STUDS NEEDED IS ";K
900 GOTO 1300
910 REM**********NUMBER OF CEILING JOIST NEEDED**********
920 PRINT "CEILING JOISTS ARE RELATIVELY EASY TO FIGURE. ALL"
930 PRINT
940 PRINT "THAT IS NEEDED IS THE WALL LENGTH."
950 PRINT
960 PRINT "WHAT IS YOUR WALL LENGTH";
970 INPUT L
980 LET M=L*3/4+1
990 PRINT "THE NUMBER OF CEILING JOISTS NEEDED IS";
1000 PRINT M
1010 GOTO 1300
1020 REM**********SHEATHING**********
1030 PRINT
1040 PRINT "TO ESTIMATE THE AMOUNT OF SHEATHING NEEDED WE NEED TO"
1050 PRINT
1060 PRINT "TAKE THE PERIMETER OF THE BUILDING TIMES THE HEIGHT"
1070 PRINT
1080 PRINT "OF THE WALLS AS MEASURED FROM THE TOP OF THE FOUNDATION."
1090 PRINT
1100 PRINT "THEN WE MUST SUBTRACT ANY LARGE OPENINGS SUCH AS DOORS"
1110 PRINT
```

```
1120 PRINT "AND WINDOWS.  WALL OPENING ARE ROUNDED DOWN TO THE NEAREST"
1130 PRINT
1140 PRINT "FOOT. WITH SHEATHING THE WASTE IS SLIGHT AND IS NOT CONSIDERED."
1150 PRINT
1160 PRINT "WHAT IS YOUR PERIMETER";
1170 INPUT O
1180 PRINT "WHAT IS YOUR WALL HEIGHT";
1190 INPUT P
1200 PRINT "WHAT IS THE AREA OF THE WALL OPENINGS";
1210 INPUT Q
1220 LET R=(O*P-Q)/36
1230 LET N=(O*P-Q)/24
1240 PRINT "THE NUMBER OF SHEETS OF 4 BY 9 FIBER BOARD NEEDED ARE"
1250 PRINT R" SHEETS"
1260 PRINT
1270 PRINT
1280 PRINT "THE NUMBER OF 4 BY 8 SHEETS OF SHEATHING NEEDED IS ";N
1290 GOTO 1300
1300 PRINT
1310 PRINT
1320 DIM Y$[6]
1330 LET Y$="YES"
1340 DIMS$[6]
1350 LET S$="NO"
1360 PRINT "DO YOU WANT MORE ESTIMATIONS  "N$;
1370 DIM T$[9]
1380 INPUT T$
1390 IF T$=Y$ THEN 400
1400 IF T$=S$ THEN 1460
1410 PRINT " PLEASE PRINT YES OR NO"
1420 DIM U$[9]
1430 INPUT U$
1440 LET T$=U$
1450 GOTO 1390
1460 PRINT "GOOD BYE  "N$
1470 PRINT "I HOPE YOU FOUND THIS PROGRAM USEFUL."
1480 END
```

Example IV

Instructional Software

Name of Program Common Machine Shop Formulas

Make and Model of Computer on Which it is Used HP 2000 Timesharing Language HP BASIC

FOR SALE

No (tape or disk). This and other programs are printed in Iowa. Handbook of BASIC computer programs for Industrial Arts. For info. write: Iowa DPI, Career Ed. Div. Grimes State Office Bldg. Des Moines, Iowa 50319

DEVELOPER

Ronald L. Ainley
Hempstead High School
Dubuque, IA

CONTACT PERSON

Ronald L. Ainley
Hempstead High School
Dubuque, Iowa

VOCATIONAL AREA(S)

Machine Shop

FOR WHICH STUDENTS

All

PROGRAM FORMAT

Problem Solving

PROGRAM DESCRIPTION

This program is designed for secondary and post-secondary machine tools classes. It consists of several formulas which are common to general machine shop practice. When using this program the student simply chooses the problem area in which they are working and supplies the necesssary data.

The program can be used to find the following information:

Major diameter of number drills
Tap drill sizes
Sharp V thread depth
Cutting speeds
Spindle RPM
Shaper cutting speeds
Shaper strokes per minute
Taper per foot
Sine of angles

It can be used for problem-solving situations outside the classroom, for homework assignments, or to calculate information which relates to a lab exercise or student project. The instructor should encourage students to make mathematical calculations instead of estimating or guessing on machine tool information.

See following pages for program listing.

COMMON MACHINE SHOP FORMULAS

The Program:

```
 10 PRINT TAB(5)"COMMON MACHINE SHOP FORMULAS"
 20 PRINT
 30 PRINT T$[10]
 40 PRINT "THIS IS A PROGRAM OF COMMON MACHINE SHOP FORMULAS"
 50 PRINT
 60 PRINT
 70 PRINT "WHICH FORMULA DO YOU WISH TO USE?"
 80 PRINT TAB(5)"1. MAJOR DIAMETER OF NUMBER DRILLS"
 90 PRINT TAB(5)"2. TAP DRILL SIZE"
100 PRINT TAB(5)"3. SHARP V THREAD DEPTH"
110 PRINT TAB(5)"4. CUTTING SPEEDS (FPM OR CS)"
120 PRINT TAB(5)"5. SPINDLE RPM"
130 PRINT TAB(5)"6. SHAPER CUTTING SPEED"
140 PRINT TAB(5)"7. SHAPER NUMBER OF STROKES PER MINUTE"
150 PRINT TAB(5)"8. TAPER PER FOOT"
160 PRINT TAB(5)"9. SINE OF ANGLE"
170 PRINT TAB(5)"10. STOP"
180 INPUT A
190 IF A>= 11 THEN 70
200 GOTO A OF 210,360,540,700,890,1050,1200,1360,1540,1770
210 REM *** MAJOR DIAMETER OF NUMBER SCREWS AND TAPS
220 PRINT "THIS FORMULA CALCULATES THE MAJOR DIAMETER OF NUMBER"
230 PRINT "SCREWS AND TAPS."
240 PRINT "WHAT SIZE NUMBER DRILL OR TAP ARE YOU USING?"
250 PRINT
260 INPUT A
270 LET B=(A*.013)+.06
280 PRINT B;" = MAJOR DIAMETER"
290 PRINT
300 PRINT "WANT ANYMORE MAJOR DIAMETER OF NUMBER SCREWS AND"
310 PRINT "TAPS INFORMATION?
320 PRINT "ANSWER YES OR NO"
330 INPUT T$
340 IF T$[1,1]="Y" THEN 240
350 GOTO 70
360 REM *** TAP DRILL SIZE ***
370 PRINT "SUPPLY THE FOLLOWING INFORMATION IF YOU WANT TO FIND"
380 PRINT "THE CORRECT TAP DRILL DIAMETER."
390 PRINT "WHAT IS THE MAJOR DIAMETER OF YOUR TAP?"
400 INPUT C
410 PRINT "HOW MANY THREADS PER INCH IS YOUR TAP?"
420 PRINT
430 INPUT D
440 PRINT
450 LET E=C-(1/D)
460 PRINT
470 PRINT E;" = TAP DRILL SIZE
480 PRINT
490 PRINT "DO YOU WANT TO FIND ANYMORE TAP DRILL DIAMETERS?"
500 PRINT "ANSWER YES OR NO"
510 INPUT T$
```

```
520 IF T$[1,1]="Y" THEN 370
530 GOTO 70
540 REM *** SHARP V THREAD DEPTH ***
550 PRINT "IF YOU WANT TO FIND THE THREAD DEPTH OF SHARP V"
560 PRINT "THREADS PLEASE SUPPLY THE FOLLOWING INFORMATION."
570 PRINT
580 PRINT "WHAT IS THE PITCH OF YOUR THREADS (NO. OF THREADS"
590 PRINT "PER INCH)?"
600 INPUT E
610 LET G = (1/F)*.866
620 PRINT
630 PRINT G;" = SHARP V THREADS"
640 PRINT
650 PRINT "DO YOU NEED TO KNOW ANYMORE SHARP V THREAD DEPTHS?
660 PRINT "ANSWER YES OR NO"
670 INPUT T$
680 IF T$[1,1]="Y" THEN 580
690 GOTO 70
700 REM *** CUTTING SPEEDS ***
710 PRINT "IF YOU WISH TO FIND THE CORRECT CUTTING SPEED FOR LATHE,"
720 PRINT "DRILL PRESS OR MILLING MACHINE WORK YOU WILL NEED TO"
730 PRINT "SUPPLY THE FOLLOWING INFORMATION."
740 PRINT "WHAT IS THE DIAMETER OF YOUR WORKPIECE? IF FINDING"
750 PRINT "THE CS FOR A DRILL PRESS OR MILLING MACHINE, WHAT IS YOUR"
760 PRINT "DRILL OR MILL CUTTER DIAMETER?"
770 INPUT H
780 PRINT "AT WHAT RPM DO YOU WISH YOUR MACHINE TO OPERATE?"
790 INPUT I
800 LET J=H*I*3.14/12
810 PRINT
820 PRINT J;" = CUTTING SPEED"
830 PRINT
840 PRINT "DO YOU NEED ANYMORE CUTTING SPEEDS?"
850 PRINT "ANSWER YES OR NO"
860 INPUT T$
870 IF T$[1,1]="Y" THEN 740
880 GOTO 70
890 REM *** SPINDLE RPM ***
900 PRINT "TO CALCULATE THE CORRECT RPM YOUR MACHINE IS TO OPERATE,"
910 PRINT "WHAT IS THE CS OR FPM FOR THE MATERIAL AND TOOLING"
920 PRINT "YOUR JOB REQUIRES?"
930 INPUT K
940 PRINT "WHAT IS THE DIAMETER OF YOUR WORKPIECE? IF USING A"
950 PRINT "DRILL PRESS OR MILLING MACHINE YOU MUST SUPPLY THE"
960 PRINT "DIA. OF YOUR DRILL OR CUTTER?"
970 INPUT L
980 LET M=K*4/L
990 PRINT M;" = SPINDLE RPM"
1000 PRINT "DO YOU WANT TO FIND ANYMORE SPINDLE RPM?"
1010 PRINT "ANSWER YES OR NO"
1020 INPUT T$
1030 IF T$[1,1]-"Y" THEN 910
1040 GOTO 70
1050 REM *** SHAPER CUTTING SPEED ***
1060 PRINT "WHEN USING A SHAPER, TO FIND THE CORRECT CUTTING SPEED"
1070 PRINT "YOU MUST SUPPLY THE FOLLOWING INFORMATION."
1080 PRINT "WHAT IS THE LENGTH OF STROKE YOUR SHAPER IS OPERATING?"
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```
1090 PRINT "AT";N$;"?"
1100 INPUT N
1110 PRINT "HOW MANY STROKES PER MINUTE ARE YOU OPERATING YOUR SHAPER?"
1120 INPUT O
1130 LET P=N*O/7
1140 PRINT P;" = SHAPER CUTTING SPEED"
1150 PRINT "DO YOU WANT MORE SHAPER CUTTING SPEEDS?"
1160 PRINT "ANSWER YES OR NO"
1170 INPUT T$
1180 IF T$[1,1]="Y" THEN 1080
1190 GOTO 70
1200 REM *** SHAPER NUMBER OF STROKES PER MINUTE ***
1210 PRINT "BEFORE YOU SET YOUR SHAPER FOR THE CORRECT NUMBER OF"
1220 PRINT "STROKES PER MINUTE, CHECK THE CS CHART FOR THE CORRECT"
1230 PRINT "CUTTING SPEED OF THE MATERIAL YOU ARE SHAPING."
1240 PRINT "WHAT IS THE CS OF THE MATERIAL YOU ARE SHAPING?"
1250 INPUT Q
1260 PRINT "WHAT IS THE LENGTH OF YOUR STROKE?"
1270 INPUT R
1280 LET S=(Q*7)/R
1290 PRINT S;" = NUMBER OF SHAPER STROKES PER MINUTE"
1300 PRINT
1310 PRINT "DO YOU WANT ANYMORE SHAPER STROKES PER MINUTE INFORMATION?"
1320 PRINT "ANSWER YES OR NO"
1330 INPUT T$
1340 IF T$[1,1]="Y" THEN 1240
1350 GOTO 70
1360 REM *** TAPER PER FOOT ***
1370 PRINT " IN ORDER TO FIND THE TAPER PER FOOT USING THIS METHOD"
1380 PRINT "YOU NEED TO KNOW THE LARGER DIAMETER, SMALL DIAMETER,"
1390 PRINT "AND THE LENGTH OF THE TAPER. WHAT IS THE LARGE"
1400 PRINT "DIAMETER OF YOUR TAPER?"
1410 INPUT U
1420 PRINT "WHAT IS THE SMALL DIAMETER OF YOUR TAPER?"
1430 INPUT V
1440 PRINT "WHAT IS THE LENGTH OF YOUR TAPER?"
1450 INPUT W
1460 LET X=(U-V)/W*12
1470 PRINT X;" = TAPER PER FOOT"
1480 PRINT
1490 PRINT "DO YOU WANT TO SOLVE ANYMORE TAPER PER FOOT PROBLEMS?"
1500 PRINT "ANSWER YES OR NO"
1510 INPUT T$
1520 IF T$[1,1]="Y" THEN 1370
1530 GOTO 70
1540 REM *** SINE OF ANGLE ***
1550 PRINT "TO FIND THE SINE OF AN ANGLE YOU FIRST FIND THE DISTANCE"
1560 PRINT "FROM THE SURFACE PLATE TO THE BASE OF THE SINE BAR."
1570 PRINT "AFTER YOU FIND THIS DISTANCE GO TO A TABLE OF NATURAL TRI-"
1580 PRINT "GONOMETRIC FUNCTIONS TO FIND THE ANGLE WHICH CORRESPONDS"
1590 PRINT "WITH YOUR ANSWER."
1600 PRINT "WHAT IS THE DISTANCE FROM THE SURFACE PLATE TO THE BASE"
1610 PRINT "OF THE ELEVATED END OF YOUR SINE BAR?"
1620 INPUT Y
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1630 PRINT "WHAT LENGTH SINE BAR ARE YOU USING?"
1640 INPUT Z
1650 PRINT
1660 LET A1=Y/Z
1670 PRINT A1;" SINE OF ANGLE"
1680 PRINT "TAKE THE SINE OF THE ANGLE YOU HAVE JUST FOUND"
1690 PRINT "AND FIND THE CORRESPONDING NUMBERS ON A"
1700 PRINT "TABLE OF NATURAL TRIGONOMETRIC FUNCTIONS. THIS"
1710 PRINT "WILL GIVE YOU YOUR ANSWER TO THE NEAREST DEGREE AND MINUTE."
1720 PRINT "DO YOU WANT TO FIND MORE SINE OF ANGLES?"
1730 PRINT "ANSWER YES OR NO"
1740 INPUT T$
1750 IF T$[1,1]="Y" THEN 1600
1760 GOTO 70
1770 REM *** STOP ***
1780 PRINT
1790 END
```

Example V

Computer Hardware Modifications

Shadow/VET (SHADOW/V)

DEVELOPER

Scott Instruments
Denton, TX

CONTACT PERSON

Prentke Romich Co.
8769 Twp. Rd. 513
Shreve, OH 44676-9421
216/567-2906

WHERE IT IS USED

Any in which the Apple II computer is used.

PROBLEM(S) IT OVERCOMES

Inability of a severely physically disabled person to program a computer or control various devices manually.

FIELD TESTED

Info. not available

REGULATORY APPROVAL

Info. not available

WARRANTY PROVIDED

Info. not available

FOR SALE

Yes.
$995

Order from: Prentke Romich Co.
8769 Twp. Rd. 513
Shreve, OH 44676-
216/567-2906 9421

HOW IT WORKS

This accessory for the Apple II computer is a voice recognition system that permits a severely handicapped individual to operate various other devices using his or her voice. With this system, verbal command as well as manual keyboard operation can be used interchangeably.

The Shadow/VET is compatible with many computer languages, including Basic, APPLESOFT®, MACHINE CODE, and PASCAL. The System is compatible with modems, printers, BSR control interfaces and many other Apple peripherals.

Example VI

Computer Hardware Modifications

Information Thru Speech (ITS)

DEVELOPER

Maryland Computer Serv. Inc.
2010 Rock Spring Rd.
Forest Hill, MD 21050
301/839-3366 or
301/938-8888

CONTACT PERSON

Jacqueline M. Downes
Maryland Computer Serv. Inc.
2010 Rock Spring Rd.
Forest Hill, MD 21050
301/839-3366
301/838-8888

WHERE IT IS USED

lawyer, teacher, researcher, secretary, counselor, librarian, engineer, programmer, etc.

PROBLEM(S) IT OVERCOMES

Visual problems which would otherwise prevent the user from reading the computer screen.

FIELD TESTED

Info. not available

REGULATORY APPROVAL

Info. not available

WARRANTY PROVIDED

Info. not available

FOR SALE

Yes.
$7,995+tax - $11,095+tax

Order from: Maryland Computer Serv. Inc.
2010 Rock Spring Rd.
Forest Hill, MD 21050
301/879-3366 or
301/838-8888

HOW IT WORKS

Information Thru Speech (ITS) is a computer system providing information both visually and vocally. With ITS, data appearing on the display screen is spoken in a synthetic voice with adjustable speech rate ranging from 45 to 720 words per minute. Users listen to all of the information on the display screen, a single line or a word at a time. Information can be spelled or repeated for verification.

A speech pad allows the manipulation of the speech functions and cursor movement with one hand. This pad allows information to be reviewed quickly and easily. For words that do not follow the standard rules of English pronunciation. abgreviations, codes or computer mnemonics, special sets of exception rules can be added by the user at any time. These rules will supersede the standard rules for pronunciation.

ITS combines the Hewlett-Packard HP125 professional computer and Maryland/ Computer Services (MCS) technology into a single package. The HP125 combines a Z-80A system microprocessor and 64K bytes of system memory. The HP125 has full capabilities as an interactive computer terminal with its own micro-processor-based intelligence.

Four Main Uses of ITS are:
- ITS runs MCS' Talking Information Management (TIM) and Automatic Form Writer (AFW)
- ITS runs other educational and business packages.
- ITS allows you access to computers.
- ITS is a powerful, programmable microcomputer with speech output and can be used to develop your own applications.

(cont. on pg. 2)

Figure VI (cont.) - Information Thru Speech (ITS)

ITS' Unique Features are:

- Unlimited speech vocabulary.
- Standard CP/M® programs can be used without program modifications.
- High level languages such as BASIC, COBOL, FORTRAN and Pascal can be used.
- Disk storage ranging from 250,000 to 8 million characters.
- Flexible disk drives (5 1/4" and 8") and hard disks are available.
- User definable speech.
- Intelligent terminal capabilities
- Two EIA standard RS 232C interfaces.
- Information retrieval program included.
- Another feature of ITS is a soft Braille display that allows information on the screen to be represented in refreshable Braille. The Braille display uses an 8-dot cell and is 40 characters long. The speech can be turned off giving you the benefit of a Braille terminal.

TIM II enables you to access multiple items of information. Any alphanumeric information can be stored on subjects such as account number, name, purchase order number, grant number, job classification, etc. This system opens the door to numerous career possibilities.

Using AFW, a typist can easily and quickly fill out forms or checks. AFW vocally informs the operator of each question on the form and the operator types the answer. Qualifiers or restrictions which prevent the typist from entering inappropriate data are placed on each response or field. AFW will perform mathematical computations on specified forms.

RESOURCES

The resources enumerated in this section cover three topic areas:

1. software vendors
2. organizations
3. publications

Because the growth of interest in and use of computer assisted instruction is so rapid it is very likely that many very good resources have not been included in these lists. Thus, the reader should consider the information which follows only a starting point from which to initiate a search for relevant and effective information.

EDUCATIONAL SOFTWARE VENDORS

ACORN Software Products, Inc.
634 N. Carolina Ave., S.E.
Washington, D.C. 20003
202/544-4259

Foreign language programs for the TRS-80 Model I and Model III computers.

Activity Resources, Inc.
P.O. Box 4875
Hayward, CA 94540
415/782-1300

Thirty-six programs for instruction and enrichment in basic math, Grades 4-6. For the TRS-80 and Apple II.

Addison-Wesley Publishing Company
2725 Sand Hill Rd.
Menlo Park, CA 94025
415/854-0300

Computer math games for Grades 1-9 and a computer graphing experiments package for high school students will be available this August. Both for the Apple II.

Apple-Cations
21650 W. Eleven Mile Rd.
Suite 103
Southfield, MI 48076
313/354-2559

English and math games for primary school children; study quizzes for Grades 4 through college. All for Apple.

Apple Computer Inc.
10260 Bandley Drive
Cupertino, CA 94017
408/996-1010

Elementary-level programs in math; elementary- and secondary-level tutorials on programming; an author language called *Shell Games* and the simulation game *Lemonade*.

Atari, Inc.
1272 Borregas Ave.
Sunnyvale, CA 94086
408/745-5069

Elementary, secondary and college level programs in history, sociology, physics, algebra, spelling, economics and other subjects.

Avant-Garde Creations
P.O. Box 30161
Eugene, OR 97403
503/345-3043

Complete CAI packages in mathematics, physics, chemistry, biology, English and German available for the Apple II.

Basics and Beyond Inc.
P.O. Box 10
Amawalk, NY 10501
914/962-2355

Math, spelling, geography, vocabulary and game programs for the TRS-80 Level II.

Bell & Howell
7100 N. McCormick Rd.
Chicago, IL 60645
312/262-1600

Genis I and PASS, two authoring languages.

Bluebird's Computer Software
2267 23rd St.
Wyandotte, MI 48192
313/285-4455

Typing programs, math/statistical packages and games for the TRS-80.

Borg-Warner Educational Systems
600 W. University Drive
Arlington Heights, IL 60004
800/323-7577
800/942-6995 (Illinois)

Publishes Critical Reading, an eight-disk computer-managed instruction system.

The Bottom Shelf
751 DeKalb Industrial Way
Atlanta, GA 30033
404/296-2003

A library of 100 programs for the TRS-80 sold as a package. Some are educational.

Brain Box
601 W. 26th St.
New York, NY 10003
212/989-3573

Fourth-grade through high-school programs in reading, English, social studies and American history for TRS-80 and Apple.

California Software
P.O. Box 275
El Cerrito, CA 94530
415/527-8717

Programs for teaching COBOL and ALGOL on the high school level. For any CP/M-based machine.

Charles Mann & Associates
55722 Santa Fe Trail
Yucca Valley, CA 92284
714/365-9718

Features management programs - scheduling, recordkeeping, grades, budgeting - as well as instructional programs about computers and programming for the Apple, Texas Instruments and TRS-80 computers.

Comm* Data Systems
P.O. Box 325
Milford, MI 48042
313/685-0113

Produces a once-a-month PET cassette with four elementary-level programs in the areas of math, geometry, English, logic and reading.

COMPress
A Division of Science Books International, Inc.
P.O. Box 102
Wentworth, NH 03282
603/764-5831

Problem solving and laboratory simulation programs in subjects such as energy, genetics, statistics, chemistry and evolution. High school and college level. For Apple II and Bell & Howell.

Compumax, Inc.
P.O. Box 1139
Palo Alto, CA 94301
415/321-2881

Currently has a lesson-writing system for the Atari 800. An Apple II version is forthcoming.

Computer Curriculum Corporation
P.O. Box 10080
Palo Alto, CA 94303
415/494-8450

Turnkey system in reading, language arts, math in all grade levels.

Computer Information Exchange
P.O. Box 159
San Luis Rey, CA 92068
714/757-4849

Upper elementary, high school and college programs in many subjects for the TRS-80 microcomputer.

Control Data Corporation
8100 34th Ave. South
P.O. Box O
Minneapolis, MN 55440

PLATO time-sharing system run on CDC terminals.

Cook's Computer Company
1905 Bailey Drive
Marshalltown, IA 50158

Apple II programs in math, letter and number recognition for young children, art education, typing and spelling.

CourseWare Magazine
4919 North Millbrook #222
Fresno, CA 93726

A 5-times a year magazine of educational software on cassette. PET, Apple and TRS-80 versions.

Creative Computing
(Sensational Software)
P.O. Box 1139
Morristown, NJ 07960
800/631-8112

Forty-seven software packages, including the entire line from MECC and the Huntington Computer Project. For Apple, Atari and TRS-80 microcomputers.

Duxbury Systems, Inc.
56 Main St.
Maynard, MA 01754
617/897-8207

Micro Braille System. Translates normal print text into contracted (Grade II) braille. Software is sold along with appropriate hardware.

DYNACOMP, Inc.
1427 Monroe Ave.
Rochester, NY 14618
716/442-8960

Two programs for young children: Teacher's PET for counting, arithmetic and word-recognition, available for TRS-80, Apple, Atari, PET, Northstar and CP/M-based systems; Hodge Podge, hit any key for an "educational happening" on the screen. Apple only.

Education Programs
Disney Electronics
6153 Fairmont Ave.
San Diego, CA 92120
714/281-0285

Preschool alphabet drill; reading, language arts and math, Grades K-8. TRS-80; soon to be available for Apple.

Educational Activities, Inc.
1937 Grand Ave.
Baldwin, NY 11510
800/645-3739

Reading, spelling, language arts, classroom management and mathematics programs for the PET, TRS-80 Level II and Apple II Plus.

Educational Courseware
3 Nappa Lane
Les Port, CT 06880
203/227-1438

Apple Basic Tutor - tutorial disks in biology, world history, astronomy, physics, population studies and test forms for junior and senior high and college students.

Educational Services Management Corporation
P.O. Box 12599
Research Triangle Park, NC 27709
919/781-1500

Administrative and special-purpose software includes Instruct II, a computer-managed instruction system for the Apple. Will contract to develop software for individual client needs and machines.

Educational Software Midwest
414 Rosemere Lane
Maquoketa, IA 52060
319/652-2334

C-BITS, Computer-Based Individualized Testing System, allows teachers to construct multiple-choice, true-false and fill-in or matching tests. For Apple II and Bell & Howell computers.

Educational Software Professionals, Ltd.
38437 Grand River
Farmington Hills, MI 48018
313/477-4470

Grammar drills, retailing math, educational charades, chemistry and test-writing programs for the Apple II.

Edu-Soft Steketee Educational Software
4639 Spruce St.
Philadelphia, PA 19139
215/747-1284

Math programs for the Apple II and TRS-80

Edutek Corp.
P.O. Box 11354
Palo Alto, CA 94306
415/325-9965

Reading and math game-oriented drills for pre-school and elementary grades. For the Apple II computer.

Edu-Ware Services, Inc.
22222 Sherman Way
Suite 102
Canoga Park, CA 91303
213/346-6783

Software for the Apple II and Apple II Plus includes reading, math and programs that test eye-hand coordination, among others.

Entelek
P.O. Box 1303
Portsmouth, NH 03801
603/436-0439

Over 100 computer books and programs for Apple, TRS-80, PET and DEC computers. Math, Science, graphics and computer language.

Gentech Corporation
4101 N. St. Joseph Ave.
Evansville, IN 47712
812/423-4200

Sells an interactive video system that includes both hardware and educational software.

Hartley Software
P.O. Box 431
Dimondale, MI 48821
616/942-8987

K-8 reading, language arts and math programs for the Apple II microcomputer.

Hayden Book Company, Inc.
50 Essex St.
Rochelle Park, NJ 07662
201/843-0550

Educational software in math.

High Technology Software Products, Inc.
P.O. Box 14665
8001 N. Classen Blvd.
Oklahoma, OK 73113
405/840-9900

Administrative packages and chemistry lab simulations for the Apple.

Houghton Mifflin Co.
One Beacon St.
Boston, MA 02107
617/725-5000

The Answer, a turnkey hardware/software instructional management system. (See also, Time Share Corp.)

Information Unlimited Software, Inc.
281 Arlington Ave.
Berkeley, CA 94707
415/525-9452

Word processing, data management, mailing programs and Tellstar, an educational astronomy program. All for the Apple computer.

Instant Software
Peterborough, NH 03458
603/924-7296

Apple elementary math materials.

Instructional Development Systems
29 Virginia Beach Blvd.
Virginia Beach, CA 23452
804/340-1977

Multigrade AIDS software for the Apple.

J.L. Hammett Company, Inc.
Hammett Place
P.O. Box 545
Braintree, MA 02184
617/848-1000

All subject areas, K-12, for the TRS-80, Apple and PET microcomputers.

K-12 MicroMedia
P.O. Box 17
Valley Cottage, NY 10989
914/358-2582

Programs for the PET, Atari, Apple and TRS-80 (K-12) in math, language arts, reading, science, computer literacy, social studies and early childhood (from many software producers).

Krell Software
21 Milbrook Drive
Stony Brook, NY 11790
516/751-5139

SAT preparation programs for the TRS-80, PET and Apple computers.

Learning Tools Inc.
4 Washburn Place
Brookline, MA 02146
617/566-7585

Management systems for general and special education - a curriculum management system, a teacher planning system and an administrative planning system. Available for Apple, TRS-80, North Star, Commodore, Texas Instruments, Zenith and other computers.

Level IV Products Inc.
32461 School Craft
Livonia, MI 48150
313/525-6200

Typing, math, English; all grade levels. For Radio Shack TRS-80.

McGraw-Hill
1221 Ave. of the Americas
New York, NY 10020
212/997-6194

Two McGraw Hill divisions are developing software. The Greg Division has a computer literacy program for the Apple II that teaches problem solving with computers using the Pascal language; Webster Division is developing three packages for the TRS-80: the Search Series of programs in geology, history and civics for Grades 4-6, and Introduction to Microcomputers and a math skills package for Grades 4-8.

MECC Publications
2520 Broadway Drive
St. Paul, MN 55113
612/376-1118

Math, language arts, social studies and science for the Apple. All grade levels.

Med Systems Software
P.O. Box 2674
Chapel Hill, NC 27514
919/942-7949

Mathematical and money skills tutoring games for grade school children for the TRS-80.

MicroGnome
5843 Montgomery Rd.
Elkridge, MD 21227
301/796-2456

CAI authoring system for the TRS-80 that allows teachers without programming experience to create their own software. Also Mathematics in Energy for Grades 8-9.

Micro Learningware
P.O. Box 2134
N. Mankato, MN 56001
507/625-2205

Over 80 programs for the TRS-80, Apple and PET computers. Grades 5-12 in math, spelling, history, science, business and geology.

Microphys Programs
2048 Ford St.
Brooklyn, NY 11229
212/646-0140

Administrative packages and over 180 programs in physics, chemistry, calculus, mathematics, vocabulary and spelling for the PET and Apple.

Microsoft Consumer Products
400 108th Ave., N.E.
Bellevue, WA 98004
206/454-1315

Educational software for the Apple and TRS-80. Two products, Typing Tutor and mu-Math, for Grade 9 through college.

Milliken Publishing Co.
Computer Department
1100 Research Blvd.
St. Louis, MO 63132
314/991-4220

Math Sequences Package and a new language arts series (available September 1, 1981) for the Apple. All grade levels.

Milton-Bradley Co.
Shaker Rd.
E. Longmeadow, MA 01028
413/525-6411

Math and language arts programs for the middle elementary grades for use with Apple microcomputer; available late Fall 1981.

Monument Computer Service
Village Data Center
P.O. Box 603
Joshua Tree, CA 92252
800/854-0561
800/432-7257, ext. 802
(California)

Complete administrative package for high school and junior high. Apple.

National Software Marketing
4701 McKinley St.
Hollywood, FL 33021
305/625-6062

Integrated accounting package for college accounting and computer courses for the TRS-80 Model I and Model II computers.

Personal Software
1330 Bordeaux
Sunnyvale, CA 94086
408/745-7841

Visicalc, an electronic accounting worksheet with educational applications for the Apple, TRS-80 and Atari.

Powersoft
P.O. Box 157
Pitman, NJ 08071
609/589-5500

Engineering, math and statistical software. For secondary and college levels. For Apple.

Prescription Learning
1301 S. Wabash Ave.
Chicago, IL 60605
312/922-0579

Elementary reading and math lab for remedial students. Available only as a total system. For Commodore PET.

Program Design, Inc. (PDI)
11 Idar Court
Greenwich, Ct 06830
203/661-8799

Programs for TRS-80, PET, Apple II and Atari; primarily language arts, but also programming and math.

Programma International
2908 N. Naomi St.
Burbank, CA 91504
213/954-0240

Currently produces five educational programs: two astronomy programs for the Apple, a spelling drill for all ages and a function plotting mathematics program, also both for Apple, and an advanced, computer algebra program for the Apple, TRS-80 and PET microcomputers.

Programs for Learning
P.O. Box 954
New Milford, CT 06776
203/355-3452

Chemistry programs for high school and first and second years of college.

Quality Education Design
P.O. Box 12486
Portland, OR 97212

Upper-elementary and junior high math programs for Apple and TRS-80.

Radio Shack Education Division
1600 One Tandy Center
Fort Worth, TX 76102
817/390-3832

Math programs, elementary through secondary level. Language arts series for pre-school and early elementary that focuses on keyboard familiarization. Three authoring systems.

Random House
High School Division
2970 Brandywine Rd.
Suite 201
Atlanta, GA 30341

Math, reading, language arts and management systems for TRS-80 and Apple II. All grades.

Right On Programs
P.O. Box 977
Huntington, NY 11743

Math, social studies and science programs for elementary level. An elementary library program. Also junior high language arts. For PET, TRS-80 and Apple.

Science Research Associates
155 North Wacker Drive
Chicago, IL 60606
800/621-0664
312/984-2000 (Illinois)

Classroom management system for math (Grades 4-10); Math facts, Automated Instruction, Drill and Evaluation (AIDE) for Grades 1-6; arithmetic games.

Scott, Foresman & Co.
1900 East Lake Ave.
Glenview, IL 60025
312/729-3000

Early reading and beginning math for Grades K-3 and LOGO. All for Texas Instruments.

Simutex
P.O. Box 13687
Tucson, AZ 85712
602/323-9391

Games for all age groups. Written for TRS-80.

Software Exchange
P.O. Box 68
Milford, NH 03055
603/673-5144

Preschool games. Word processing systems. For TRS-80, Apple, Atari.

SoftWare House, Inc.
695 East 10th North
Logan, UT 84321
800/453-2708

Math programs and games for Atari and Apple computers.

Solartek
P.O. Box 298
Guilderland, NY 12084

Solar energy game and solar home simulations for the TRS-80 Level II.

Sterling Swift Publishing Company
1600 Fortview Rd.
Austin, TX 78704
512/444-7570

Texts and workbooks for organizing classroom courses or segments of courses with software serving to reinforce the printed materials.

Teaching Tools: Microcomputer Services
P.O. Box 12679
Research Triangle Park, NC 27709
919/851-2374

Educational software for the PET in addition, subtraction, spelling, matching games, and letters and numbers programs for young children.

T.H.E.S.I.S.
P.O. Box 147
Garden City, MI 48135
313/595-4722

Word games, math practice, instructional games for Apple II, Atari.

3 R Software
P.O. Box 3115
Jamaica, NY 11431

An elementary and middle school language arts series (198 lessons) for TRS-80.

Time Share Corp.
Hanover, NH 03755
603/448-3838

Reading, math, language arts curriculum and management systems for elementary and middle grades. A guidance information system. (See also Houghton Mifflin Co.)

Transnet Corporation
1945 Route 22
Union, NJ 07083
201/688-7800

Sells Apple computers along with packaged programs.

TYC Software
40 Stuyvesant Manor
Genesco, NY 14454
716/243-3005

Spelling for elementary school, earth science for junior and senior high; test writing and management system for teachers. All TRS-80 Level II (cassetee only)

Unicom
297 Elmwood Ave.
Providence, RI 02907
401/467-5600

Language/reading development program,
K-college.

Vocational Studies Center
Univ. of WI - Madison

ORGANIZATIONS WHICH HELP EDUCATORS USE MICROCOMPUTERS IN TEACHING AND LEARNING

The information presented below was compiled from two sources: The Educational R & D Report, and the July/August 1981 issue of Classroom Computer News.

Apple Computer Clearinghouse
for the Handicapped
Prentke Romich Company
R.D. 2, P.O. Box 191
Shreve, OH 44676
Contact: Neil Russel, Computer Manager
216/767-2906

Prentke Romich Company, a firm that manufactures electronic aids for the severely handicapped, is starting a clearinghouse for information about Apple software being developed to aid individual handicapped people. A catalog will offer descriptions, operational instructions and information on essential hardware and prices. Individuals wishing to share programs they have developed may do so by requesting and submitting an application form. Prentke Romich also develops custom software.

Apple for the Teacher
c/o Ted Perry
5848 Riddio St.
Citrus Heights, CA 95610

Apple for the Teacher operates the National Computer-Assisted Instruction Library for the Apple, which has software contributed from all over the world. The group's newsletter reviews educational software and provides recent information on educational computing grants and research.

Association for Computing Machinery (ACM)
1133 Avenue of the Americas
New York, NY 10036
Contact: Member Services
212/265-6300

ACM is an association for computer scientists, business systems specialists, analysts, and social scientists interested in computing and data processing. The purpose of the organization is to advance the science and art of information processing, including computing techniques and appropriate language for general information and processing, storage, retrieval, transmission/communication, and simulation of data.

ACM has produced a publication on the use of computers by schools, titled Computer Education for Elementary and Secondary Schools (order No. 812810, 1981, 92 pp., $7 for members, $10 for nonmembers). It can be purchased from the ACM Order Department, P.O. Box 64145, Baltimore, MD 21264. All orders must be prepaid.

Association for Development of
Computer-based Instructional Systems (ADCIS)
ADCIS Headquarters
Computer Center
Western Washington University
Bellingham, WA 98225
Contact: Gordon Hayes, Executive Secretary
206/676-2860

ADCIS is an international, nonprofit organization representing elementary and secondary school systems, colleges, universities, business, industry, and military and government agencies. The purposes of ADCIS include advancing the investigation and utilization of computer-based instruction and management; promoting and facilitating the interchange of information, programs and materials; reducing redundant effort among developers; and specifying requirements and priorities of hardware and software development.

The ADCIS News is a bimonthly newsletter mailed to all its members. A scholarly publication, The Journal of Computer-Based Instruction, is published four times a year (free to ADCIS members, $12 to nonmembers). ADCIS operates several special interest groups including ones for Plato users, mini/microcomputer users, elementary/secondary and junior college personnel, and individuals involved in the Interactive Instructional System Presentation and Authority. Membership in ADCIS is $30 a year for individuals who are affiliated with an institutional or associate member, and $40 for those who are not.

Association for Educational Communications
and Technology (AECT)
1126 16th St., N.W.
Washington, D.C. 20036
202/833-4180

AECT, an organization of media professionals, seeks to improve learning through the effective use of media and technology. Its national convention in May 1982 will feature workshops and exhibits on microcomputers. It also supports a special task for on microcomputers. Publications: *Educational Communication and Technology Journal, Journal of Instructional Development, Instructional Innovator.*

Association for Educational Data Systems (AEDS)
1201 16th Street, N.W.
Washington, D.C. 20036
Contact: Shirley Easterwood, Executive Director
202/833-4100

AEDS is a professional organization for those interested in the use of computers in education. AEDS produces three quarterly publications: the AEDS Bulletin, which focuses on interchapter communications and meeting announcements ($7 a year); the AEDS Monitor, which contains short, timely articles on current directions in educational data systems ($15 a year); and the AEDS Journal, which features articles illustrating the latest developments in the application of computer technology to all areas of education ($25 a year).

An individual membership ($35) includes subscriptions to all three publications. The special fall 1979 issue of AEDS Journal covered "Microcomputers: Their Selection and Application in Education"; single copies can be purchased for $10.

Additional activities include an annual international convention, special seminars and workshops that provide opportunities to examine and discuss the latest developments in educational technology, and a computer programming contest for students in grades 7 through 12.

The Boston Computer Society
Educational Resource Exchange
Three Center Plaza
Boston, MA 02108
Contact: Bonnie Turrentine, Beth Lowd
617/367-8080

The Boston Computer Society newsletter, *The Boston Computer Update*, publishes a column on educational computing. In addition, BCS's Educational Resource Exchange provides information on funding, teacher training, equipment selection and software availability.

Computer Literacy
1466 Grizzly Park Blvd.
Berkeley, CA 94707
Contact: Arthur Luehrmann, Herbert Peckham or
Martha Ramirez
415/644-2400

Computer Literacy offers hands-on courses in computing to teachers and others in the community. It will also provide strategic planning for computer education in the schools and will develop computer literacy curricula for schools.

Computer-Using Educators (CUE)
c/o W. Don McKell
Independence High School
1776 Educational Park Drive
San Jose, CA 95133

CUE is a California-based association with members from around the country. Its activities include: a bimonthly newsletter, two major conferences a year, a microcomputer demonstration center and software library, and inserivce training provided in conjunction with San Jose State University. It also helps other educational organizations set up computer workshops for their conferences.

Computertown, USA!
P.O. Box E
Menlo Park, CA 94025
Contact: Ramon Zamora, Director
415/327-0541

Computertown, USA! is a computer literacy project of the people of Menlo Park Library, and the Peoples Computer Company, a non-profit education corporation in Menlo Park. The goals of this National Science Foundation Funded project are to develop, test and evaluate a set of course materials and operating procedures for a transportable microcomputer-based community literacy program. The model project emphasizes the use of local community resources.

The courseware is based on a series of six-week classes for children and adults dealing with introductory materials, BASIC programming, and project-based programming experiences. Courseware includes student workbooks, teacher guides, handouts, and lists of recommended software that complement the class activities. These items will be available for dissemination in late 1983.

A free newsletter, Computertown, USA! News Bulletin is published monthly. To obtain a subscription, write to the above address.

CONDUIT
P.O. Box 388
University of Iowa
Iowa City, IA 52244
Contact: Harold Peters, Associate Director
319/353-5789

CONDUIT is a source for computer-based instructional materials that are reviewed, documented, programmed for ease of transfer, and continually updated. Programs are written in BASIC and FORTRAN. Materials programmed in BASIC will run on most minicomputer systems and some microcomputer systems. Other CONDUIT materials are being translated to run on the more popular microcomputers.

Microcomputer materials are currently available in biology, chemistry, physics, mathematics and statistics, spanish, psychology, and sociology. Materials are available for use on the PET 2001, Apple II, and TRS-80.

Three types of educational materials are also available from CONDUIT: general information about the use of computers in higher education; aids for authors and developers of computer-based instructional materials; and reports on CONDUIT reviewed and tested materials. CONDUIT Pipeline ($15 a year) is a semiannual publication featuring ideas for use in higher education and complete descriptions of CONDUIT's latest reviewed and tested materials. Aids available for developing instructional computing materials include CONDUIT Author's Guide: How to Design, Develop and Package Instructional Materials for widespread Distribution (1978, $10) and CONDUIT BASIC Guide (1979, $10). A publication titled Microcomputer Versions of CONDUIT Reviewed and Tested Packages (single copy free) describes CONDUIT packages implemented on microcomputers. A set of guidelines for authors of microcomputer materials is also under development.

DataSpan
University of Michigan
109 E. Madison Street
Ann Arbor, MI 48104
Contact: Karl Zinn
313/763-4410

DataSpan, a project funded by the National Science Foundation, will develop, disseminate and update an information bank on computer applications in science education. It will also report on, package and distribute exemplary software packages and will help establish teleconferencing systems.

Educational Resources Center Library
San Mateo County Office of Educatoin
333 Main St.
Redwood City, CA 94063
Contact: Ann Lathrop, Library Coordinator

The *Softswap*, a joint project of the San Mateo County Office of Education, Redwood City, California, and Computer-Using Educators (CUE), has approximately 200 public domain programs available for exchange.

Most *Softswap* programs are short, stand-alone instructional units. Many are drill-and-practice exercises written for elementary school work or for remedial work at the secondary level; about one-fourth are math oriented.

Educational Technology Center
University of California
Irvine, CA 92717
Contact: Al Bork
714/883-6945

The Educational Technology Center strives to enhance the learning process through the use of computers and other advanced technology. Center activities range from research to curriculum development. Three current projects are: developing testing and tutorial materials for large university science courses (the resulting materials will be released through CONDUIT); developing science literacy materials for use in public places; producing computer-based learning materials for junior high students.

EDUCOM
P.O. Box 364
Princeton, NJ 08540
609/734-1915

EDUCOM serves colleges and universities throughout the country. Its overall purpose is to promote more effective use of computers and other technology in higher education, particularly through resource sharing. Special services include EDUNET, a network serving 168 institutions, and EDUCOM Consulting Group. EDUCOM produces three publications.

Human Resources Research Organization (HumRRO)
300 North Washington Street
Alexandria, VA 22314
Contact: Beverly Hunter
703/549-3611

HumMRO is a behavioral science research organization that has undertaken several projects involving computer-assisted instruction. It is currently working on a curriculum guide for computer literacy. In December 1980, HumMRO and MECC held a joint conference on goals for computer literacy. A report on that conference, *National Goals for Computer Literacy*, will be forthcoming.

Intentional Educations
51 Spring Street
Watertown, MA 02172
Contact: Laura Koller
617/923-7707

In addition to publishing *Classroom Computer News*, Intentional Educations develops educational software and will soon provide inservice training in educational computing.

International Council for Computers
in Education (ICEE)
Department of Computer and Information Science
University of Oregon
Eugene, OR 97403
Contact: David Moursund
503/686-4405

The International Council for Computers in Education (ICEE) is a non-profit professional organization dedicated to improving the instructional use of computers. The Computer Teacher ($14.50 for nine issues per year) is a journal for people interested in the instructional use of computers at the precollege level. It deals with the use of computers and their impact on the general curriculum.

Two instructional booklets are available. The School Administrator's Introduction to Instructional Use of Computers is intended for school administrators and school board members who have had little experience with computers. The booklet provides a series of questions and answers about the instructional use of computers and the potential for the use in schools. The Teachers Guide to Computers in the Elementary School can help elementary school teachers with little formal computer training to gain an initial level of computer literacy. (Each booklet costs $2.50 prepaid; quantity discounts are available for 11 or more copies of the same title.) Additional booklets on other topics of interest to teachers are being prepared.

Michigan Association for Computer Users
in Learning (MACUL)
c/o Wayne County Intermediate
School District
33500 Van Born Rd.
Wayne, MI 48184
Contact: Larry Smith
313/326-9300

MACUL sponsors yearly state-wide and regional conferences. In addition, it has collected nine diskettes of public domain, educational software for the Apple. These are available for $9.00 by mail; they can also be copied free at MACUL conferences. The group is interested in acquiring similar software for Radio Shack, Atari, and other microcomputers. The *MACUL Journal* has reviewed over 100 programs; the next issue will review another 130.

Micro Co-op
P.O. Box 432
West Chicago, IL 60185
312/231-0912

Micro Co-op is a software cooperative that makes Apple and Atari software available to members at a 10 percent discount. It publishes a bimonthly newsletter that provides product listings and objective comparisons of existing products. The co-op is not tied to any software publisher, although it does market its own products under the Co-op Software label. Membership is a one-time $3.00 fee. Each year, membership is automatically renewed for any member who has made at least one purchase during the previous year.

Microcomputer Center
San Mateo Educational Resources
Center Library
333 Main Street
Redwood City, CA 94063
Contact: Ann Lathrop
415/363-5469

The Microcomputer Center offers educators in San Mateo County an opportunity to sample a variety of computers and to preview and evaluate educational software. It houses the *Softswap* and provides inservice training. Educators from other counties are welcome to use the center's resources on an informal basis.

Microcomputer Resource Center
Teachers College
Columbia University
525 W. 121st Street
New York, NY 10027
Contact: Karen Billings, director
212/678-3740

The Microcomputer Resource Center and the EPIE Institute are jointly evaluating the major, commercially available, computer-based curriculum packages.

Microcomputer Education Applications
Network (MEAN)
256 N. Washington Street
Falls Church, VA 22046
Contact: Alfred J. Morin, director
703/536-2310

MEAN helps educators develop and sell software; it conducts workshops on microcomputer applications for administrators and teachers; and it helps local districts and state education agencies develop educational computing programs. MEAN also publishes a newsletter.

Minnesota Education Computing
Consortium (MECC)
2520 Broadway Drive
St. Paul, MN 55113
Contact: Executive Director
612/376-1122

MECC is an organization created to coordinate and provide computer services to students, teachers and educational administrators in Minnesota. At present, approximately 2,000 computer terminals and 2,500 microcomputers are located in schools and colleges across the state.

A Documentation Center makes available written materials ranging from periodic newsletters to curriculum guides that offer assistance in implementing computer use in the classroom. The bimonthly newsletter, called USERS, lists available diskettes that can be used with the Apple II, support booklets for these diskettes, and programming and reference manuals. (Non-Minnesota customers must pay a surcharge to cover the MECC operating costs paid by MECC-member institutions.) Both USERS and Dataline, another bimonthly MECC newsletter, are free upon request.

The North Carolina Instructional
Computing Project
116 W. Edenton Street
Education Building, Rm. 58
Raleigh, NC 27611
Contact: Margaret H. Bingham, project coordinator 919/733-4695

This state-run project provides one-day inservice sessions on microcomputer awareness for teachers in the North Carolina Schools, and more intensive training for administrators and microcomputer consultants. It maintains the Educational Media Review and Evaluation Center, which reviews software and makes those reviews available to visiting teachers. The center has prepared a comprehensive software evaluation form. Ms. Bingham, project coordinator, will consult with educators interested in establishing similar state-run projects.

Northwest Regional Educational Laboratory
Microcomputer Software and Information
for Teachers
(MicroSIFT) 300 S.W. Sixth Avenue
Portland, OR 97204
Contact: Jeri Marler, Program Assistant
503/248-6800, ext. 437

MicroSIFT, a project of Northwest Regional Educational Laboratory, serves as a clearinghouse for microcomputer K-12 instructional software information. The clearinghouse focuses both on establishing effective procedures for the collection, evaluation, and dissemination of materials and information, and on providing user support and technical assistance. Additional information is available through MicroSIFT News, a quarterly newsletter. To be placed on the MicroSIFT News mailing list, write to the above address.

Society for the Applied Learning
Technology (SALT)
50 Culpepper Street
Warrenton, VA 22186
Contact: Raymond Fox, President
703/347-0055

SALT is a nonprofit organization for professionals in the area of instructional technology (membership, $20 a year). Members receive the quarterly Newsletter. Other publications include the Journal of Educational Technology Systems ($22.50 a year for members; $51 a year for nonmembers), Microcomputers in Education and Training (1979, $30) and Videodisc, Microcomputer and Learning System Technologies in Public, Vocational, Medical and Handicapped Education and Training (1980, $40).

Technical Education Research Centers (TERC)
Computer Resource Center
8 Eliot Street
Cambridge, MA 02138
Contact: Daniel Watt, Director
617/547-3890

The Computer Resource Center (CRC) of TERC contains microcomputer hardware, software, curricula and technical information of interest to educators.

CRC maintains representative computers, collects and evaluates machine-specific educational software, and houses a library of related technical and educational publications. Hands On! is an occasional newsletter that is free upon request.

CRC also conducts one and two day workshops on educational uses of microcomputers at TERC and at schools in the New England area. Contact the Director for additional information.

University of Washington Computing
Information Center
3737 Brooklyn Ave., N.E.
Seattle, WA 98105
206/543-5818

This computing resource center contains 5,000 books, 6,000 technical reports adn 570 periodicals covering all aspects of computing. The center's purpose is to provide access to computing literature - including that on educational computing. Specialized bibliographies, reference services and borrowing privileges are available. It publishes a bimonthly magazine, *Computing Resources for the Professional.*

Vocational Studies Center
Univ. of WI - Madison

International Council for Computers in Education (ICCE)
Organization Members

Alaska Association for Computers in Education (AACE)
Contact: Kathleen L. Castle, Adult Education Coordinator, The Northern Institute
650 W. International Airport Rd.
Anchorage, AK 99502

Alberta Association for Educational Data Systems
Contact: Ann Brebner, President
838 Education Tower, University of Calgary
2500 University Dr. N.W., Calgary
Alberta, Canada T2N 1N4

Computers, Learners, Users, Educators Association (CLUES)
Contact: Henry J. Petersen, Executive Director
50 Nellis Drive
Wayne, NJ 07470

Computer-Using Educators (California)
Contact: Don McKell
P.O. Box 18547
San Jose, CA 95158

DIDACOM
Contact: Inno Broekman
Avenbeeck 98, 2182 RZ Hillegom
The Netherlands

Educational Computing Consortium of Ohio
Contact: Ellen Richman, Coordinator
4777 Farnhurst Road
Cleveland, OH 44124

Educational Computing Organization of Ontario (ECOO)
Contact: Robert E. Drake, President
252 Bloor Street West
Toronto, Ontario, Canada M5S 1V6

Educators Interest Group of the San Diego Computer Society
Contact: Melvin L. Zeddies
P.O. Box 81537
San Diego, CA 92138

Illinois Association for Educational Data Systems (ILAEDS)
Contact: Lyle B. Smith, President
Computer Science Department,
Northern Illinois University
DeKalb, IL 60115

Indiana Computer Educators
Contact: David A. Flowers
Ft. Wayne Community Schools
Adm., Cwt.
1230 So. Clinton St.
Ft. Wayne, IN 46802

Manitoba Association for Educational Data Systems (MAN-AEDS)
Contact: E. Boorsman, Secretary-Treasurer
1577 Wall Street
East Winnipeg, Manitoba, Canada R3E 2S5

Michigan Association for Computer Users in Learning (MACUL)
Contact: Lary R. Smith, Communications Sect.
33500 Van Born Road
Wayne, MI 48184

Minnesota Association for Educational Data Systems
Contact: Sue Talley
1925 W. County Rd. B2
St. Paul, MN 55113

New Hampshire Association for Computer Education Statewide (NHACES)
Contact: Anne Knight, Acting President
University of New Hampshire
Computer Services
Durham, NH 03824

Northwest Council for Computer Education (Oregon, Washington and Northern Idaho)
Contact: Howard Bailey
Computing Center
Eastern Oregon State College
Le Grande, OR 97850

Saskatchewan Association for Computers in Education
Contact: Duncan Campbell
Mt. Royal Collegiate
2220 Rusholme Road
Saskatoon, Saskatchewan,
Canada S7L 4A4

The Science Teachers' Association of Ontario
Contact: Warren Sirrs
1032 Harkness Ave.
Ottawa, Ontario, Canada K1V 6P2

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Society of Data Educators (SDE)
Contact: Dana H. Verry, Executive Director
983 Fair Meadow Road
Memphis, TN 38117

Texas Computer Education Association
Contact: Vicki S. Smith
7131 Midbury
Dallas, TX 75230

The Utah Council for Computers in Education
Contact: Dr. Larry C. Christensen
1295 North 1200 West
Mapleton, UT 84663

Wyoming Educational Computing Council
Contact: Robert L. Morissette, President
Laramie County School District #1
Administration Bldg., 2810 House Ave.
Cheyenne, WY 82001

Vocational Studies Center
Univ. of WI - Madison

PUBLICATIONS WHICH FOCUS ON THE CLASSROOM

[Taken from: Learning, January 1982, p. 30.]

Classroom Computer News, Intentional Educations, 51 Spring St., Watertown, MA 02172; bimonthly ($12/yr.). Covers many aspects of classroom computers and educational technology in nontechnical terms. A special resource issue, "The First Annual Compendium of Common and Uncommon Computer Lore" (July/August 1981), is available for $5 from P.O. Box 266, Cambridge, MA 02138.

Computer Time, Robert Stuart Junior High School Computer Club, Caswell Ave., West, Twin Falls, ID 83301; six issues per year ($1.50/yr.). Newsletter that explores the subject of programming in the schools.

Creative Computing, 39 E. Hanover Ave., Morris Plains, NJ 07950; monthly ($20/yr.). A leading consumer magazine that features articles about small computers and their applications to work, learning, education and recreation.

Educational Computer, 10439 N. Stelling Rd., Cupertino, CA 95014; bimonthly ($12/yr.). Addresses the impact of microcomputers in schools, covers critical issues in education, and includes articles by educators about their experiences with technology and education.

Educational Technology, Educational News Service, 140 Sylvan Ave., Englewood Cliffs, NJ 07632; monthly ($49/yr.). Covers most aspects of educational technology through feature articles, reviews and commentaries.

Electronic Learning, Scholastic, Inc., 50 W. 44th St., New York, NY 10036; bimonthly ($15/yr.). A new professional publication for educators who buy and use electronic hardware and software in elementary and secondary education.

The Journal of Computers in Mathematics and Science Teaching, P.O. Box 4455, Austin, TX 78765; quarterly ($7/yr.). Provides a forum for the exchange of information about teaching mathematics and science with computers, addresses the impact of computers on curricula, reviews math and science software, and announces conferences and events of interest. Subscribers are encouraged to submit articles.

The Computing Teacher, Department of Computer and Information Science, University of Oregon, Eugene, Oregon 97403; monthly during the school year. (approximately $14.50/yr.)

Recreational Computing, People's Computer Company, 1263 El Camino Real, Box E, Menlo Park, CA 94025; bimonthly ($12/yr.). Looks at the future of home, school and personal computing, and provides articles, games, software, fiction and programming languages.

School Microware Reviews, Dresden Associates, P.O. Box 246, Dresden, ME 04342; biannual ($20/issue). Publishes software evaluations submitted by microcomputer users.

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T.H.E. Journal: Technological Horizons in Education, Information Synergy, Inc., P.O. Box 992, Acton, MA 01720; six issues per year ($15/yr.), free to department chairpersons, principals and other school supervisors. Covers information and issues dealing with computers, audio-visual equipment and techniques, learning by videotape and disk, as well as other technological advancements affecting education.

ADDITIONAL PUBLICATIONS ON COMPUTERS AND THE HANDICAPPED

The Bulletin of Science and Technology for the Handicapped. American Association for the Advancement of Science, 1515 Massachusetts Avenue, Washington, D.C. 20005

Closing the Gap (newspaper on computers and the disabled). Budd Hagen, Editor, Route 2, Box 39, Henderson, MN 56004

Communication Outlook. Artificial Language Laboratory, Michigan State Laboratory, East Lansing, MI 48824

International Software Registry of Programs Written or Adapted for Handicapped Individuals. Trace Research and Development Center, 314 Waisman Center, 1500 Highland Ave., University of Wisconsin, Madison, WI 53706

Link and Go. Published by: The Committee on Personal Computers and the Handicapped (COPH-2), 2030 Irving Park Rd., Chicago, IL 60618. 312/477-1813

REFERENCES

DeBoer, B. and Sullivan, D.W. Software packages in GOAL-ABE. Address given at the Microcomputers in Vocational Education Conference. Madison, Wisconsin. August 13, 1982.

Gephart, W.J., Strother, D.B. and Duckett, W. Practical applications of research newsletter of Phi Delta Kappa's center on evaluation, development and research. Vol. 4, No. 4, June, 1982.